Importation into the United States From South Korea of Fresh Cucurbit Fruits for Consumption

Qualitative, Pathway-Initiated Pest Risk Assessment

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A. Introduction

This pest risk assessment was prepared by the Animal and Plant Health Inspection Service (APHIS) of the U.S. Department of Agriculture (USDA) to examine plant pest risks associated with the importation into the United States of **fresh cucurbit fruits, (*Citrullus vulgaris*,watermelon; *Cucurbita maxima*, squash; *Cucumis sativus*, cucumber; and *Cucumis melo*, oriental melon) grown in South Korea** (Suh, 1991; Lee, 1992). Hereafter in this document the use of the term cucurbit(s) will mean the above named species. This is a qualitative pest risk assessment, that is, estimates of risk are expressed in qualitative terms such as high or low as opposed to numerical terms such as probabilities or frequencies.

International plant protection organizations (*e.g.*, North American Plant Protection Organization (NAPPO), International Plant Protection Convention (IPPC) of the United Nations Food and Agriculture Organization (FAO)) provide guidance for conducting pest risk analyses. The methods we used to initiate, conduct, and report this plant pest risk assessment are consistent with guidelines provided by NAPPO, IPPC and FAO. Our use of biological and phytosanitary terms (*e.g.*, introduction, quarantine pest) conforms with the *NAPPO Compendium of Phytosanitary Terms* (NAPPO 1996) and the *Definitions and Abbreviations* (Introduction Section) in *International Standards for Phytosanitary Measures, Section 1—Import Regulations: Guidelines for Pest Risk Analysis* (FAO 1996).

Pest risk assessment is one component of an overall pest risk analysis. The *Guidelines for Pest Risk Analysis* provided by FAO (1996) describe three stages in pest risk analysis. This document satisfies the requirements of FAO Stages 1 (initiation) and 2 (risk assessment).

The Food and Agriculture Organization (FAO, 1996) defines "pest risk assessment" as "Determination of whether a pest is a quarantine pest and evaluation of its introduction potential". "Quarantine pest" is defined as "A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled" (FAO, 1996; NAPPO, 1996). Thus, pest risk assessments should consider both the likelihood and consequences of introduction of quarantine pests. Both issues are addressed in this qualitative pest risk assessment.

This document presents the findings of our qualitative plant pest risk assessment. We have not described in detail our assessment methods or the criteria we used to rate the various risk elements. Details of our methodology and rating criteria can be found in our "template" document: ***Pathway-Initiated Pest Risk Assessment: Guidelines for Qualitative Assessments, version 4.0*** (USDA, 1995); to obtain a copy of our template, contact the individual named on the front of this risk assessment.

B. Risk Assessment

1. Initiating Event: Proposed Action

This pest risk assessment is commodity-based, and therefore "pathway-initiated"; we initiated the assessment in response to the request for USDA authorization to allow imports of a particular commodity presenting a potential plant pest risk. In this case, the importation of certain fresh cucurbit fruits grown in South Korea into the U.S. is a potential pathway for introduction of plant pests. Quarantine 56 (7 CFR §319.56) provides a general regulatory authority for importation of fruits and

vegetables.

The cucurbits belong to the Cucurbitaceae family which consists of about 90 genera and about 700 species existing in the tropical regions with some extending into temperate zones. Both annual and perennial species exist within these rapid-growing frost-tender herbs grown for the edible fruits and for ornaments. The are about 25 species in the genus *Cucurbita* [all supposed to be American (Bailey, 1949)], four recognized species of *Citrullus* one of which is widely grown for its edible fruit, some 30 species of *Cucumis* a few of which are grown for the edible fruits.

2. Assessment of Weediness Potential of Korean Cucurbits

Tables 1, 1a, 1b, and 1c shows the results of our weediness screening for *Citrullus vulgaris, Cucumis sativus, Cucumis melo,* and *Cucurbita maxima*. These finding did not require us to initiate a pest-initiated pest risk assessment for any of these species.

Table 1: Process for Determining Weediness Potential of Commodity

Commodity: *Citrullus vulgaris = C. lanatus var lanatus* (watermelon)

Phase 1: *Citrullus vulgaris* is grown commercially in the U.S and seeds are sold throughout the U.S. for private gardens.

Phase 2: Is the species listed in:

Yes	*Geographical Atlas of World Weeds* (Holm, 1979)
NO	*World's Worst Weeds* (Holm, 1977)
NO	*Report of the Technical Committee to Evaluate Noxious Weeds; Exotic Weeds for Federal Noxious Weed Act* (Gunn & Ritchie, 1982)
NO	*Economically Important Foreign Weeds* (Reed, 1977)
Yes	Weed Science Society of America list (WSSA, 1989)
Yes	Is there any literature reference indicating weediness (*e.g.*, *AGRICOLA*, *CAB*, *Biological Abstracts*, *AGRIS*; search on "species name" combined with "weed").

Phase 3: Conclusion:

The *Geographical Atlas of World Weeds* includes *Citrullus lanatus* var. *lanatus* as a common weed in Taiwan and a weed of unknown importance in Australia. Weeds included on the Weed Science Society of America list are considered "of current or potential importance in the United States".

Wild watermelon emergence and control. Smith, D. T.; Cooley, A. W., Texas Agric. Exp. Stn., College Stn., 77843, USA. Weed Science vol. 21 (6): p.570-573. Publication Year: 1973

Distribution, growth and competitiveness of wild watermelon as a weed. Smith, D. T.; Cooley, A. W.; Hemphill, T. E. Texas A&M Univ., College Station, USA. Miscellaneous Publication, Texas Agricultural Experiment Station (No. MP-1056): 8 pp. Publication Year: 1972

However, this plant does not meet the definition of a Federal Noxious Weed because it is not "new to, or not widely prevalent in the United States."

Table 1a: Process for Assessing Weediness Potential of Plant Species

Species: *Cucumis sativus* L. (cucumber)

Phase 1: Cucumis sativus is grown commercially in the U.S. and seeds are sold throughout the U.S. for private gardens.

Phase 2: Is the species listed in:

Yes *Geographical Atlas of World Weeds* (Holm, 1979)

NO *World's Worst Weeds* (Holm, 1977)

NO *Report of the Technical Committee to Evaluate Noxious Weeds: Exotic Weeds for Federal Noxious Weed Act* (Gunn & Ritchie, 1982)

NO *Economically Important Foreign Weeds* (Reed, 1977)

NO Weed Science Society of America List (WSSA, 1989)

NO Is there any literature reference indicating weediness (*e.g.*, *AGRICOLA*, *CAB*, *Biological Abstracts*, *AGRIS*; search on "species name" combined with "weed").

Phase 3: Conclusion:

The *Geographical Atlas of World Weeds* includes *Cucumis sativus* as a common weed in Australia and a weed of unknown importance in Cambodia and India. This plant does not meet the definition of a Federal Noxious Weed because it is not "new to, or not widely prevalent in the United States."

Table 1b: Process for Assessing Weediness Potential of Plant Species

Species: *Cucumis melo* L. (melon)

Phase 1: *Cucumis melo* is grown commercially within the U.S. and seeds are sold throughout the U.S. for private gardens.

Phase 2: Is the species listed in:

Yes *Geographical Atlas of World Weeds* (Holm, 1979)

NO *World's Worst Weeds* (Holm, 1977)

NO *Report of the Technical Committee to Evaluate Noxious Weeds: Exotic Weeds for Federal Noxious Weed Act* (Gunn & Ritchie, 1982)

NO *Economically Important Foreign Weeds* (Reed, 1977)

NO Weed Science Society of America List (WSSA, 1989)

NO Is there any literature reference indicating weediness (*e.g.*, *AGRICOLA*, *CAB*, *Biological Abstracts*, *AGRIS*; search on "species name" combined with "weed").

Phase 3: Conclusion:

The *Geographical Atlas of World Weeds* includes *Cucumis melo* as a principal weed in Columbia and a weed of unknown importance in Ghana, West Polynesia and Sudan. The Weed Science Society of America includes one variety, *C. melo* var. *dudaim* Naud. (smallmelon).

This species does not meet the definition of a Federal Noxious Weed because it is not "new to, or not widely prevalent in the United States."

Table 1c: Process for Assessing Weediness Potential of Plant Species

Species: *Cucurbita maxima* Duchesne

Phase 1: *Cucurbita maxima* is grown commercially in the U.S. and seeds are sold throughout the U.S. for private gardens.

Phase 2: Is the species listed in:

NO *Geographical Atlas of World Weeds* (Holm, 1979)

NO *World's Worst Weeds* (Holm, 1977)

NO *Report of the Technical Committee to Evaluate Noxious Weeds: Exotic Weeds for Federal Noxious Weed Act* (Gunn & Ritchie, 1982)

NO *Economically Important Foreign Weeds* (Reed, 1977)

NO Weed Science Society of America List (WSSA, 1989)

NO Is there any literature reference indicating weediness (*e.g.*, *AGRICOLA*, *CAB*, *Biological Abstracts*, *AGRIS*; search on "species name" combined with "weed").

Phase 3: Conclusion:

Species within the genus *Cucurbita* are considered native to the U.S. and *C. maxima* does not meet the definition of a Federal Noxious Weed because it is not "new to, or not widely prevalent in the United States."

3. Previous Risk Assessments, Current Status and Pest Interceptions

3a. Decision history for cucurbit fruits from East Asia:

1992 - Korea: Cucurbits - Entry denied into U.S., no treatment available for Bactrocera depressus (Shiraki).
1986 - Japan: Cucumis melo - Entry denied into U.S., no treatment available for Dacus depressus.
1971 - Japan & Korea: Cucurbits approved entry into Guam subject to inspection.
1970 - Japan: Cucumis sativus - Entry permitted into Guam subject to inspection.
1970 - Korea: Cucumis sativus - Entry permitted into Guam subject to inspection.
1969 - Japan: Cucumis sativus - Entry permitted into Hawaii of cucumbers subject to inspection and certification as hothouse grown on Honshu Island or north thereof.
1968 - Japan: Cucumis melo - Entry permitted into Hawaii of muskmelons subject to inspection and certification as hothouse grown on Honshu Island or north thereof.
1967 - Japan: Cucurbita maxima - Entry permitted into Guam subject to inspection.
1967 - Korea: Cucurbita maxima - Entry permitted into Guam subject to inspection.
1961 - Japan: Cucurbits spp. - Entry denied into Alaska: multiple pests.
1961 - Japan: Cucumis sativus - Entry denied into Alaska: multiple pests
1924 - China: Cucumbers - Entry denied.
1924 - Japan: Cucumbers - Entry denied.
1924 - Japan: Cucurbita maxima - Entry denied.
1923 - China: Squash & pumpkin - Entry denied.

3b. Interceptions from 1985 - 1995:

Table 2: Pest Interceptions of cucurbit fruits from Korea		
Pest	**Where Found**	**Country of Origin**
Pathogens		
Cladosporium sp.	baggage	Korea
Phomopsis sp.	baggage	Korea
Arthropods		
Pyraustinae, species of.	baggage	Korea

4. Pest List: Pests Associated with certain curcurbits in Korea

Table 3: Pest List - Korean cucurbits fruits				
Scientific Name and Classification	**Distribu-tion**[1]	**Codes**[2]	**Hosts**[3]	**References**
INSECTS				
Adoxophyes privatana Walker (Lepidoptera: Tortricidae)	KS	a	3	Anon, 1972; Hill, 1987
Agrotis segetum (Denis & Schiffermuller) (Lepidoptera: Noctuidae)	KS	a	3	Anon, 1957; Anon, 1972
Anomala cuprea Hope (Coleoptera: Scarabaeidae)	KS	a	3	Anon, 1972
Aphis gossypii Glover (Hemiptera: Aphidae)	KS,US	c,e,f,y	1,3,5	Anon, 1972; Blackman & Eastop, 1985
Atrachya menetriesi Faldermann (Coleoptera: Chrysomelidae)	KS	a	3	Anon, 1972
Aulacophora femoralis Mostschulsky (Coleoptera: Chrysomelidae)	KS	a	1,3,5	Anon, 1972
Bactrocera depressa Shiraki (Diptera: Tephritidae)	KS	z_i	2,3,4,7	Kwon, 1985; Han et al, 1994; Kim, 1994
Bourletiella hortensis Fitch (Collembola: Smynthuridae)	KS,US	c,f	1,3,5	Anon, 1972
Chrysodeixis eriosoma (Doubleday) (Lepidoptera: Noctuidae)	KS	a	1,2,6	Stout, 1982; Roberts, 1979

Diaphania indica (Saunders) (Lepidoptera: Pyralidae)	KS,US(FL)	h,z_i	1,2,3,5,6	Anon, 1972; Whittle & Ferguson, 1987
Frankliniella intonsa (Trybom) (Thysanoptera: Thripidae)	KS	e	2,4,6	Woo et al., 1991
Haplothrips chinensis Priesner (Thysanoptera: Thripidae)	KS	a	2,4,6	Woo et al., 1991
Helicoverpa armigera Hubner (Lepidoptera: Noctuidae)	KS	a	3	Avidov & Harpaz, 1969; Anon, 1970's; EPPO/CABI, 1992
Hylemya platura Meigen (Diptera: Anthomyiidae)	KS,US	c,f	1,3,5	Anon, 1972
Loxoblemmus doenitzi Stein (Orthoptera: Gryllidae)	KS	a	1,3,5	Anon, 1972
Lygus lucorum Meyer-Dur (Hemiptera: Miridae)	KS	a	1,3,5	Anon, 1972; Metcalf & Metcalf, 1993
Lygus spinolai Meyer-Dur (Hemiptera: Miridae)	KS	a	1,3,5	Anon, 1972; Metcalf & Metcalf, 1993
Mamestra brassicae (Linnaeus) (Lepidoptera: Noctuidae)	KS	a	3	Anon, 1972; Ford, 1988
Monolepta dichroa Harold (Coleoptera: Chrysomelidae)	KS	a	1,3,5	Anon, 1972
Myzus persicae Sulzer (Hemiptera: Aphidae)	KS,US	c,e,f,y	1,3,5	Anon, 1972; Blackman & Eastop, 1985
Ostrinia furnacalis (Guenee) (Lepidoptera: Pyralidae)	KS,US(GU)	h,z_i	7	Nafus & Schreiner, 1991
Phytomyza horticola Goureau (Diptera: Agromyzidae)	KS	a	2,3,6	Spencer, 1973
Spodoptera litura (Fabricius) (Lepidoptera: Noctuidae)	KS	a	6	Stout, 1982; Wallenamier, 1982
Teleogryllus emma Ohmachi & Matsuura (Orthoptera: Gryllidae)	KS	a	1,3,5	Anon, 1986
Thrips setosus Moulton (Thysanoptera: Thripidae)	KS	a,y	6	Woo et al., 1991; EPPO/CABI, 1992
Thrips tabaci Lindeman (Thysanoptera: Thripidae)	KS,US	c,f,y	1,3,5	Anon, 1972; Metcalf & Metcalf, 1993
ACARINA				
Tetranychus urticae Kock (Tetranychidea: Tetranychidae)	KS,US	c,f	1,3,5	Anon, 1972; Metcalf & Metcalf, 1993
Tetranychus kanzawai Kishida (Tetranychidea: Tetranychidae)	KS	a	5,7	Hong, 1994; Kim, 1994
BACTERIA				
Agrobacterium tumefaciens (Smith & Townsend) Conn.	KS,US	a,c	2,4,7	Bradbury, 1986
Erwinia tracheiphila (Smith) Bergey et al.	KS,US	a,c	4,6,7	Anon, 1986; Bradbury, 1986

Pseudomonas syringae pv. lachrymans (Smith & Bryan) Young, Dye & Wilkie	KS,US	c,z_e	2,6,7	Anon, 1986; Bradbury, 1986
PATHOGENS				
Alternaria cucumerina (Ellis & Ever.) J.A. Elliott (Fungi Imperfecti: Hyphomycetes)	KS,US	a,c,f	6	Anon, 1986: Farr et al, 1986; Ellis & Holliday, 1970
Athelia rolfsii (Curzi) Tu & Kimbrough (Basidiomycetes: Aphyllophorales)	KS,US	a,c,f	1,6,7	Anon, 1972; Farr et al, 1989
Botrytis cinerea Pers.:Fr. (Fungi Imperfecti: Hyphomycetes)	KS,US	a,c,f	3,5,6	Anon, 1986; Farr et al,1989
Cercospora citrullina Cooke (Fungi Imperfecti: Hyphomycetes)	KS,US	a,c,f	1-7	Anon, 1986
Cladosporium cucumerinum Ellis & Arthur (Fungi Imperfecti: Hyphomycetes)	KS,US	c,f,z^e	2,6,7	Anon, 1986; Farr et al, 1989; Jarvis, 1992
Colletrotrichum orbiculare (Berk. & Mont.) Arx (Fungi Imperfecti: Coelomycetes)	KS,US	c,f,z_e	1,2,3,5,6,7	Anon, 1986; Farr et al, 1989
Didymella bryoniae (Auersw.) Rehm (Loculoascomycetes: Dothideales)	KS,US	c,f,z_e	1,2,3,5,7	Anon, 1986; Farr et al, 1989
Erysiphe cichoracearum DC. (Pyrenomycetes: Erysiphales)	KS,US	a,c,f	1,2,3,5	Anon, 1986; Farr et al, 1989
Fusarium oxysporum Schlechtend.:Fr. f. sp. cucumerinum J. H. Owen (Fungi Imperfecti: Hyphomycetes)	KS,US	a,c,f	5,6	Anon, 1986; Farr et al, 1989
Fusarium oxysporum Schlechtend.:Fr. f. sp. melonis Snyder & Hansen (Fungi Imperfecti: Hyphomycetes)	KS,US	a,c,f	5,7	Anon, 1986; Farr et al, 1989
Fusarium oxysporum Schlechtend.:Fr. f. sp. niveum (Smith) Snyder & Hansen (Fungi Imperfecti: Hyphomycetes)	KS,US	a,c,f	1,2,3,5	Anon, 1986; Farr et al, 1989
Phytophthora melonis Katsura (Oomycetes: Peronosporales)	KS	a	6	Anon, 1986
Phytophthora nicotianae Breda de Hann var. parasitica (Dastur) Waterhouse (Oomycetes: Peronosporales)	KS,US	c,f,z_e	1,3,6,7	Anon, 1986; Farr et al, 1989; Waterhouse & Waterhouse, 1964
Pseudoperonospora cubensis (Berk. & M.A. Curtis) Rostovzev (Oomycetes: Peronosporales)	KS,US	a,c,f	1,3,5,6,7	Anon, 1986; Farr et al, 1989; Jarvis, 1992; Palti, 1975
Pythium debaryanum Hesse (Oomycetes: Peronosporales)	KS,US	a,c,f	1,3,56,7	Anon, 1986; Farr et al, 1989
Rhizoctonia solani Kuhn (Fungi Imperfecti: Agonomycetes)	KS,US	a,c,f	6,7	Anon, 1986; Farr et al, 1989; Mordue, 1974
Sphaerotheca fuliginea (Schlechtend.:Fr.) Pollacci (Pyrenomycetes: Erysiphales)	KS,US	a,c,f	1,2,3,5,6,7	Anon, 1986; Farr et al, 1989; Jarvis, 1992
VIRUSES				
Bean yellow mosaic virus	KS,US	a,c,f	2	Bos, 1970; Ryu et al., 1986; Lee et al., 1983

Cucumber green mottle mosaic virus	KS	z^i	1,3,5,6,7	Hollings et al., 1975; Lee et al., 1990
Cucumber mosaic virus	KS,US	c,f	2,3,6,7	Anon, 1972
Tobacco ringspot virus	KS,US	c,f	3,6	Stace-Smith, 1985; Cho et al., 1976
Watermelon mosaic 2 potyvirus	KS,US	a,c,f	2,4,6,7	Brunt et al., 1990; Purcifull et al., 1984
NEMATODES				
Meloidogyne arenaria (Neal) Chitwood	KS,US	a,c	1,3,5	Anon, 1972; Anon, 1985
Meloidogyne incognita (Kofoid & White) Chitwood	KS,US	a,c	1,3,5	Anon, 1972; Anon, 1985

[1]Distribution legened: KS = Korea; US = United States; FL = Florida; GU = Guam

[2]Codes:

a = Pest mainly associated with plant part other than commodity

c = Organism does not meet the geographical and regulatory definiation for a quarantine pest.

e = Although pest attacks commodity, it would not be expected to remain with the commodity during processing

f = Pest occurs in the U.S. and is not subject to official restrictions and regulations

h = Pest is present in the U.S. and is listed in the USDA catalogue of intercepted pests as actionable at ports of entry, but, the pest is not currently subject to further official restrictions and regulations

y = Pest is a vector of plant pathogen(s)

z_i = Internal: Pest is known to commonly attack or infect commodity and it would be reasonable to expect the pest may remain with the fruit during processing and shipping

z_e = External; Pest is known to infect or infest the commodity and it would be reasonable to expect the pest may remain with the commodity during processing and shipping

3 Host Code: Citrullus sp. = 1; Citrullus vulgaris = 2; Cucurbita sp. = 3; Cucurbita maxima = 4; Cucumis sp. = 5; Cucumis sativus = 6; Cucumis melo = 7

5. List of Quarantine Pests

Our list of quarantine pests for commercial shipments of cucurbits from Korea is provided in Table 4. Should any of these pests be intercepted on commercial (or any other) shipments of cucurbits, quarantine action may be taken.

Table 4: Quarantine Pests: Korean cucurbit fruits for consumption

Arthropods	*Adoxophyes privatana* Walker
	Agrotis segetum (Denis & Schiffermuller)
	Anomala cuprea Hope
	Atrachya menetriesi Mostschulsky
	Bactrocera depressa Shiraki
	Chrysodeixis eriosoma (Doubleday)
	Frankliniella intonsa (Trybom)
	Haplothrips chinensis Priesner
	Helicoverpa armigera Hubner
	Loxoblemmus doenitzi Stein
	Lygus lucorum Meyer-Dur
	Mamestra brassicae (Linnaeus)
	Monolepta dichroa Harold
	Ostrinia furnacalis (Guenee)
	Phytomyza horticola Goureau
	Spodoptera litura (Fabricius)
	Teleogryllus emma Ohmachi & Matsuura
	Thrips setosus Moulton
Acarina	*Tetranychus kanzawaii* Kishida
Pathogen	*Phytophthora melonis* Katsura
Viruses	Cucumber green mottle mosaic virus

6. Quarantine Pests Likely to Follow Pathway (*i.e.*, Quarantine Pests Selected for Further Analysis)

We analyzed in detail only those quarantine pests that can reasonable be expected to follow the pathway, *i.e.,* be included in commercial shipments of cucurbit fruits (see USDA, 1995) for selection criteria). Only quarantine pests selected for further analysis are subject to steps 7-9 below.

Table 5: Quarantine Pest Selected for Further Analysis: Korean cucurbits fruits for consumption

Arthropods	*Bactrocera depressa* Shiraki *Diaphania indica* (Saunders) *Ostrinia furnacalis* (Guenee) *Tetranychus kanzawaii* Kishida
Viruses	Cucumber green mottle mosaic virus

7. Economic Importance: Consequences of Introduction

For each quarantine pest selected for further analysis, we consider the consequences of intro-duction. For qualitative, pathway-initiated pest risk assessments, these risks are estimated by rating each pest with respect to five risk elements. A full description of these elements and rating criteria can be found in USDA (1995). Table 6 shows our risk ratings for these risk elements.

Table 6: Risk Rating: Consequences of Introduction

Pest	Climate/ Host	Host Range	Dispersal	Economic	Environ-mental	Risk Rating
Bactrocera depressa	high	medium	low	medium	high*	medium
Diaphania indica	high	medium	high	medium	high*	high
Ostrinia furnacalis	high	high	high	medium	low	high
Tetranychus kanzawaii	high	high	low	low	low	medium
Cucumber green mottle mosaic virus	medium	low	low	medium	high*	medium

*This pest is known to attack members of the plant genus *Cucurbita*. In the United States, *Cucurbita okeechobeensis* is a Federally listed endangered species. We believe it would be reasonable to assume that this pest would attack this endangered plant. Because of existing legislation regarding endangered plants, we automatically give this pest a risk rating of "high" for consequences of introduction.

8. Likelihood of Introduction

The undesireable outcome being considered is the introduction of a quarantine pest. The two general components of a pest risk assessment are estimates of the consequences and likelihood of introduction. Risk Elements in Table 7 focus on the consequences of introduction. For qualitative pest risk assessments the assessment is as shown below. There are two separate components. First, an estimate is made concerning the amount of commodity likely to be imported; the result is a risk rating (0-2) that applies to the commodity and country in question and is the same for all quarantine pest considered. And second, five biological features concerning the pest and their interactions with the commodity are considered. The resulting risk ratings are specific to each pest.

Table 7: Risk Rating: Likelihood of Introduction

Pest	Quantity of commodity imported annually	Likelihood survive postharvest treatment	Likelihood survive shipment	Likelihood not detected at port of entry	Likelihood moved to suitable habitat	Likelihood find suitable host
Bactrocera depressa	medium	high	high	high	high	high
Diaphania indica	medium	high	high	medium	high	medium
Ostrinia furnacalis	medium	high	high	medium	high	medium
Tetranychus kanzawai	medium	medium	medium	high	medium	low
Cucumber green mottle mosaic virus	medium	high	high	high	low	low

9. Conclusion: Pest Risk Potential and Phytosanitary Measures

Our measure of pest risk potential combines the risk ratings for consequences and likelihood of introduction as described in USDA (1995). Table 8 shows our estimated pest risk potential for the quarantine pests selected for further analysis for importation of Korean cucurbits.

Table 8: Pest Risk Potential, Quarantine Pests, Korean Cucurbits

Pest	Pest risk potential
Bactrocera depressa	high
Diaphania indica	high
Ostrinia furnacalis	high
Tetranychus kanzawai	medium
Cucumber green mottle mosaic virus	medium

We recommend specific phytosanitary measures for pest recieving a high PRP risk rating; port-of-entry inspection is not considered sufficient to provide phytosanitary security. APHIS has not yet determined whether risks associated with the importation of the cucurbit fruits listed in this document can be managed adequately. Detailed examination and choice of appropriate sanitary and phytosanitary measures to mitigate pest risk is undertaken as part of the pest risk management phase and is not discussed in this document. Appropriate sanitary and phytosanitary measurers to mitigate pest risk will be determined during the pest risk management phase.

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